US005682429A

United States Patent [19]

Cordery et al.

[11] Patent Number: 5,682,429

[45] Date of Patent: Oct. 28, 1997

[54] **ELECTRONIC DATA INTERCHANGE POSTAGE EVIDENCING SYSTEM**

[75] Inventors: **Robert A. Cordery**, Danbury; **Steven J. Pauly**, New Milford; **Leon A. Pintsov**, West Hartford, all of Conn.

[73] Assignee: **Pitney Bowes Inc.**

[21] Appl. No.: **522,898**

[22] Filed: **Sep. 9, 1995**

Related U.S. Application Data

[62] Division of Ser. No. 161,560, Dec. 6, 1993, Pat. No. 5,454,038.

[51] **Int. Cl.**[6] **H04L 9/32**

[52] **U.S. Cl.** **380/25**; 380/51

[58] **Field of Search** 364/464.02, 464.03; 380/23, 25, 51

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,271,452	4/1942	Adams .	
4,757,537	7/1988	Edelmann et al.	380/51
4,837,701	6/1989	Sansone et al.	364/464.03
4,873,645	10/1989	Hunter et al. .	
4,888,803	12/1989	Pastor	380/51
4,893,338	1/1990	Pastor	380/51
5,142,577	8/1992	Pastor	380/51
5,319,562	6/1994	Whitehouse .	
5,454,038	9/1995	Cordery et al.	380/51

FOREIGN PATENT DOCUMENTS

0272355	12/1986	European Pat. Off. .	
2657985	2/1990	France .	
3113934	5/1991	Japan .	
5241993	9/1993	Japan .	

Primary Examiner—Salvatore Cangialosi

Attorney, Agent, or Firm—Charles R. Malandra, Jr.; Melvin J. Scolnick

[57] **ABSTRACT**

Methods and systems for preparing mailpieces involve the creation of mailing lists which includes correct and incorrect recipient address information. The list is transmitted to a data center. Received from the data center is a mailing list including addressed hygiened recipient address information and a digital token for each mailpiece with encrypted data. The encrypted data is based on the corrected address information for mailpieces with correct address information on the transmitted mailing list and on hygiened recipient address information the mailpieces with incorrect recipient address information on the transmitted mailing list. The digital tokens for each mailpiece may also be based on the rating parameter information.

Selection is provided for utilizing a given one of the incorrect recipient address information and the correct recipient address information is applied to an encrypter generating the digital tokens. The encrypting means for generating digital tokens may be located remote from the mailer facility or on a mailer facility or other local area network. Various arrangements are employed in generating and printing digital tokens recipient address information and corrected recipient address information.

6 Claims, 15 Drawing Sheets

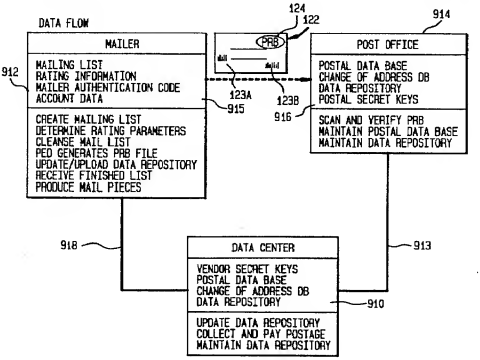


FIG. 1

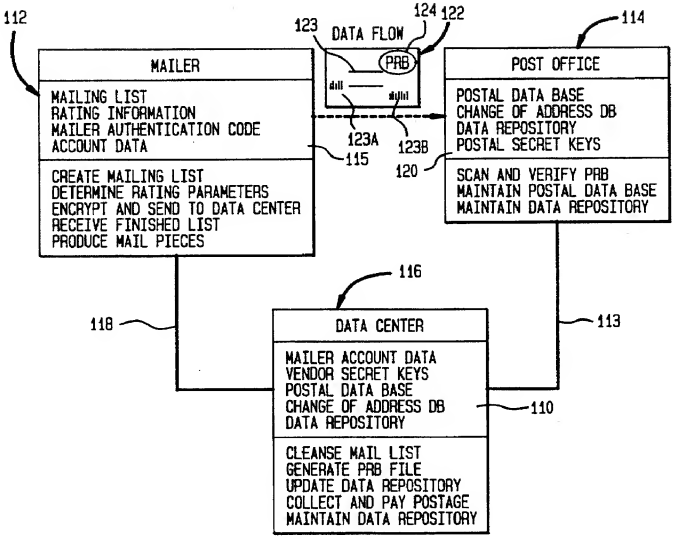

112
123
DATA FLOW
124
122
114
MAILER
PRB
POST OFFICE
MAILING LIST
RATING INFORMATION
MAILER AUTHENTICATION CODE
ACCOUNT DATA
123A
123B
POSTAL DATA BASE
CHANGE OF ADDRESS DB
DATA REPOSITORY
POSTAL SECRET KEYS
115
120
CREATE MAILING LIST
DETERMINE RATING PARAMETERS
ENCRYPT AND SEND TO DATA CENTER
RECEIVE FINISHED LIST
PRODUCE MAIL PIECES
SCAN AND VERIFY PRB
MAINTAIN POSTAL DATA BASE
MAINTAIN DATA REPOSITORY
116
118
113
DATA CENTER
MAILER ACCOUNT DATA
VENDOR SECRET KEYS
POSTAL DATA BASE
CHANGE OF ADDRESS DB
DATA REPOSITORY
110
CLEANSE MAIL LIST
GENERATE PRB FILE
UPDATE DATA REPOSITORY
COLLECT AND PAY POSTAGE
MAINTAIN DATA REPOSITORY

FIG. 2

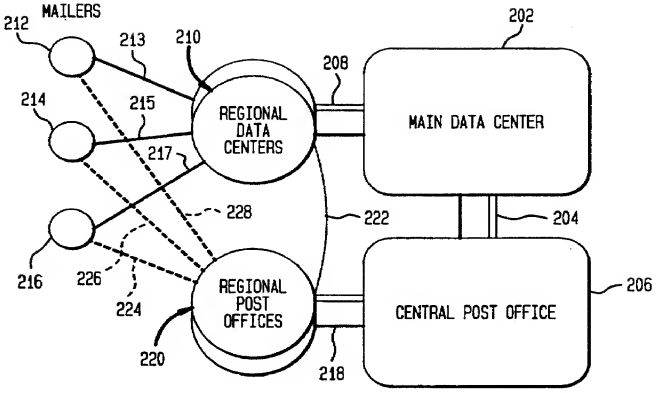

MAILERS
212
213
210
214
215
217
216
226
224
228
220
REGIONAL DATA CENTERS
REGIONAL POST OFFICES
208
222
218
202
MAIN DATA CENTER
204
CENTRAL POST OFFICE
206

FIG. 3

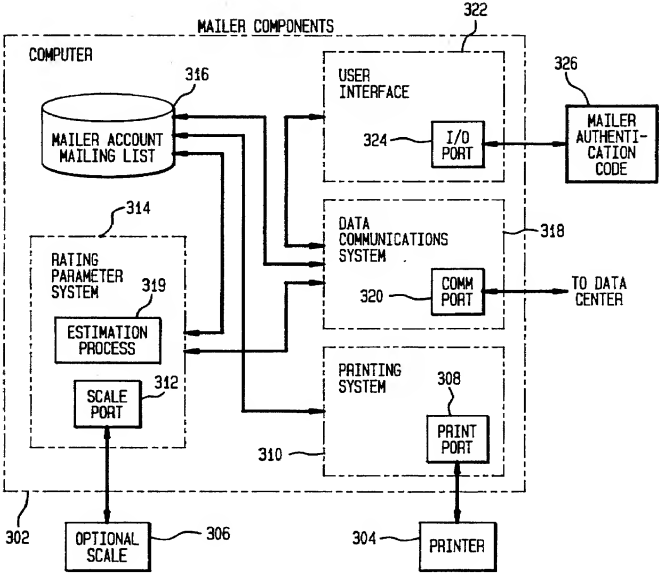

MAILER COMPONENTS
322
COMPUTER
316
MAILER ACCOUNT MAILING LIST
USER INTERFACE
324
I/O PORT
326
MAILER AUTHENTI-CATION CODE
314
RATING PARAMETER SYSTEM
319
ESTIMATION PROCESS
SCALE PORT
312
DATA COMMUNICATIONS SYSTEM
318
320
COMM PORT
TO DATA CENTER
PRINTING SYSTEM
308
PRINT PORT
310
302
OPTIONAL SCALE
306
304
PRINTER

FIG. 4

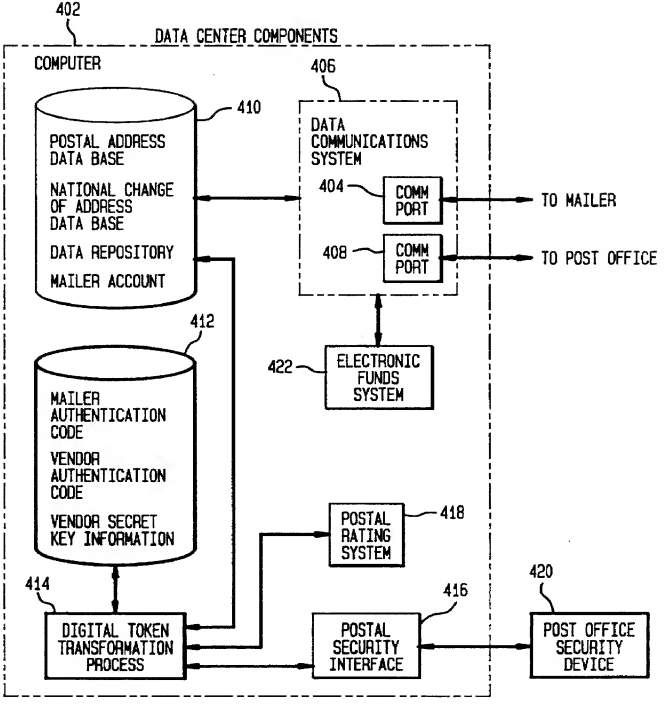

402
DATA CENTER COMPONENTS
COMPUTER
406
410
POSTAL ADDRESS DATA BASE
NATIONAL CHANGE OF ADDRESS DATA BASE
DATA REPOSITORY
MAILER ACCOUNT
DATA COMMUNICATIONS SYSTEM
404
COMM PORT
TO MAILER
408
COMM PORT
TO POST OFFICE
412
MAILER AUTHENTICATION CODE
VENDOR AUTHENTICATION CODE
VENDOR SECRET KEY INFORMATION
422
ELECTRONIC FUNDS SYSTEM
POSTAL RATING SYSTEM
418
414
DIGITAL TOKEN TRANSFORMATION PROCESS
416
POSTAL SECURITY INTERFACE
420
POST OFFICE SECURITY DEVICE

FIG. 5

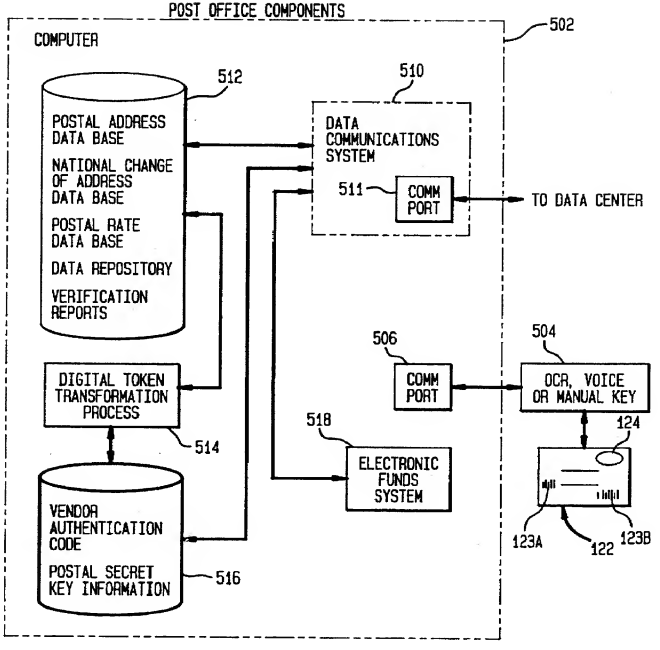
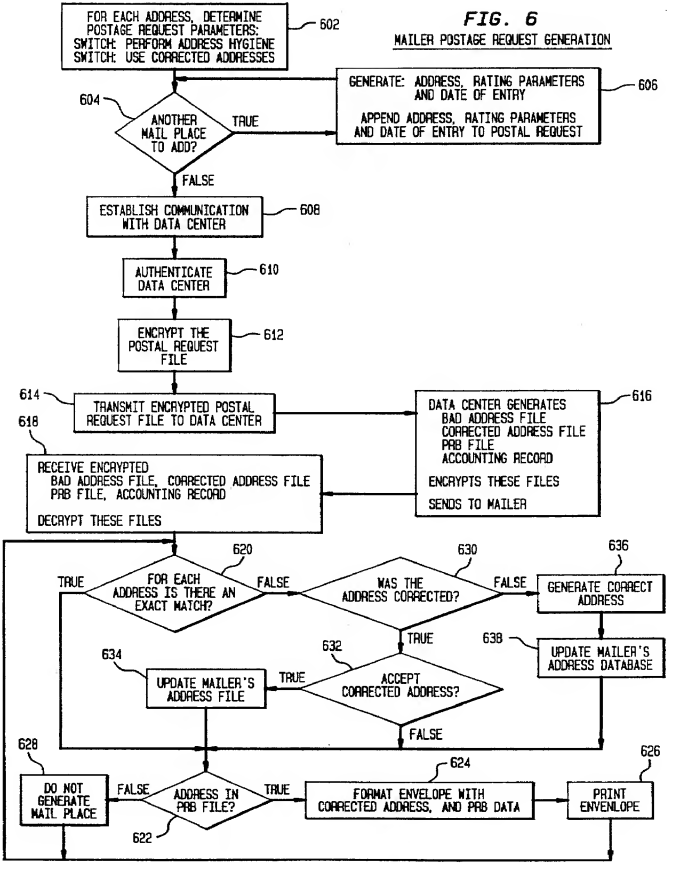

POST OFFICE COMPONENTS
COMPUTER
502
512
POSTAL ADDRESS DATA BASE
NATIONAL CHANGE OF ADDRESS DATA BASE
POSTAL RATE DATA BASE
DATA REPOSITORY
VERIFICATION REPORTS
510
DATA COMMUNICATIONS SYSTEM
511
COMM PORT
TO DATA CENTER
506
COMM PORT
504
OCR, VOICE OR MANUAL KEY
124
DIGITAL TOKEN TRANSFORMATION PROCESS
514
518
ELECTRONIC FUNDS SYSTEM
VENDOR AUTHENTICATION CODE
POSTAL SECRET KEY INFORMATION
516
123A
122
123B

FIG. 6
MAILER POSTAGE REQUEST GENERATION



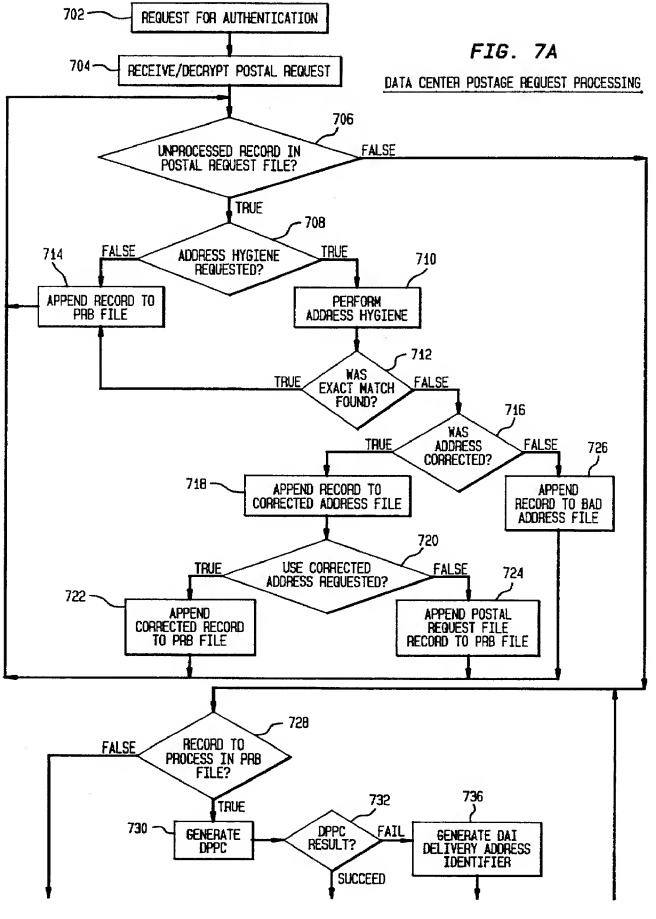


FIG. 7A

DATA CENTER POSTAGE REQUEST PROCESSING

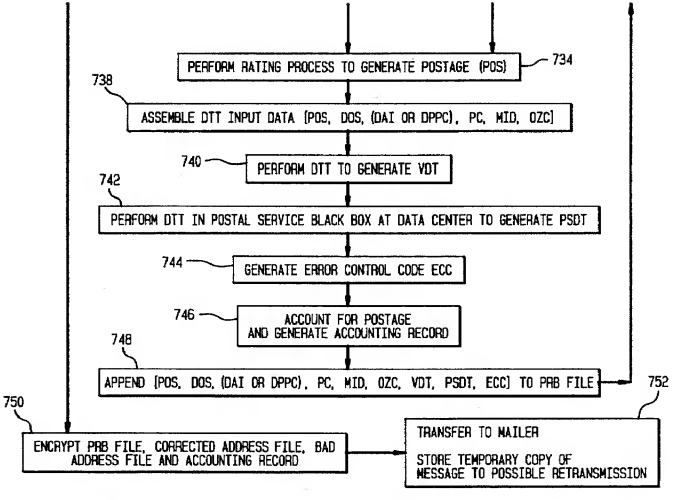

PERFORM RATING PROCESS TO GENERATE POSTAGE (POS)
734
738
ASSEMBLE DTT INPUT DATA (POS, DOS, (DAI OR DPPC), PC, MID, OZC)
740
PERFORM DTT TO GENERATE VDT
742
PERFORM DTT IN POSTAL SERVICE BLACK BOX AT DATA CENTER TO GENERATE PSDT
744
GENERATE ERROR CONTROL CODE ECC
746
ACCOUNT FOR POSTAGE AND GENERATE ACCOUNTING RECORD
748
APPEND (POS, DOS, (DAI OR DPPC), PC, MID, OZC, VDT, PSDT, ECC) TO PRB FILE
752
750
ENCRYPT PRB FILE, CORRECTED ADDRESS FILE, BAD ADDRESS FILE AND ACCOUNTING RECORD
TRANSFER TO MAILER
STORE TEMPORARY COPY OF MESSAGE TO POSSIBLE RETRANSMISSION

FIG. 7B

FIG. 7

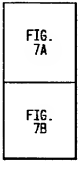


FIG. 7A
FIG. 7B

FIG. 8

VERIFICATION PROCESS

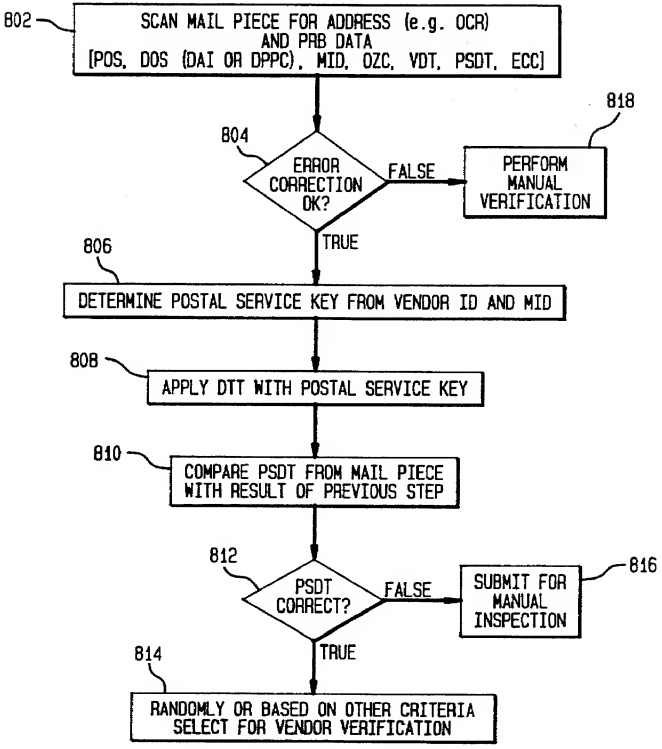


FIG. 9

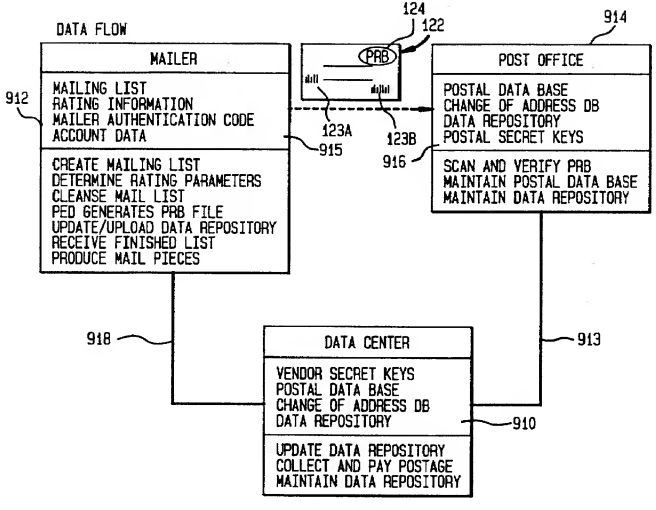

DATA FLOW
MAILER
MAILING LIST
RATING INFORMATION
MAILER AUTHENTICATION CODE
ACCOUNT DATA
912
CREATE MAILING LIST
DETERMINE RATING PARAMETERS
CLEANSE MAIL LIST
PED GENERATES PRB FILE
UPDATE/UPLOAD DATA REPOSITORY
RECEIVE FINISHED LIST
PRODUCE MAIL PIECES
124
122
PRB
123A
123B
915
916
914
POST OFFICE
POSTAL DATA BASE
CHANGE OF ADDRESS DB
DATA REPOSITORY
POSTAL SECRET KEYS
SCAN AND VERIFY PRB
MAINTAIN POSTAL DATA BASE
MAINTAIN DATA REPOSITORY
918
913
DATA CENTER
VENDOR SECRET KEYS
POSTAL DATA BASE
CHANGE OF ADDRESS DB
DATA REPOSITORY
910
UPDATE DATA REPOSITORY
COLLECT AND PAY POSTAGE
MAINTAIN DATA REPOSITORY

FIG. 10

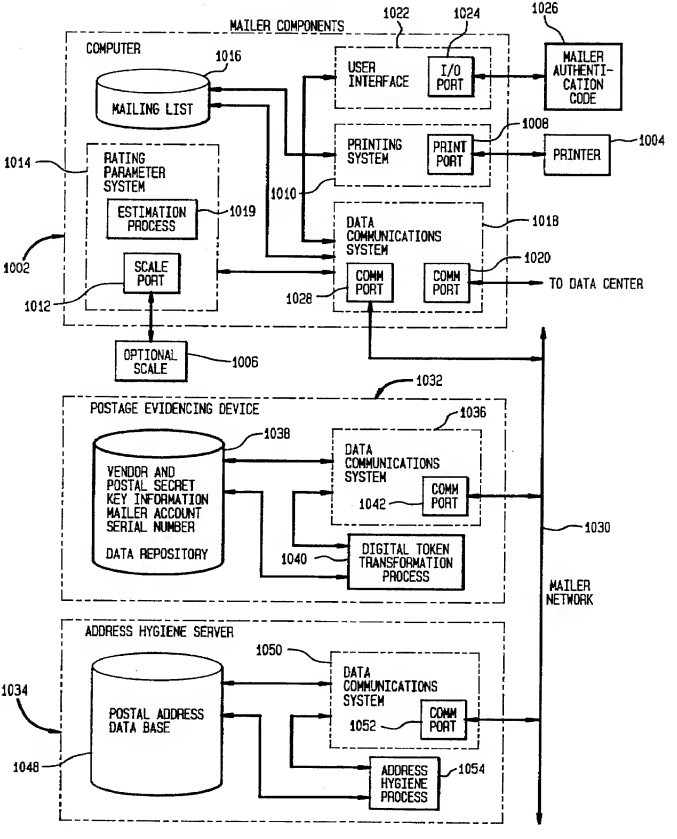

MAILER COMPONENTS
1022
1024
1026
COMPUTER
1016
MAILING LIST
USER INTERFACE
I/O PORT
MAILER AUTHENTI-CATION CODE
1008
PRINTING SYSTEM
PRINT PORT
PRINTER
1004
1014
RATING PARAMETER SYSTEM
ESTIMATION PROCESS
1019
1010
DATA COMMUNICATIONS SYSTEM
1018
1002
SCALE PORT
1020
COMM PORT
COMM PORT
TO DATA CENTER
1012
1028
OPTIONAL SCALE
1006
1032
POSTAGE EVIDENCING DEVICE
1036
1038
VENDOR AND POSTAL SECRET KEY INFORMATION MAILER ACCOUNT SERIAL NUMBER
DATA REPOSITORY
DATA COMMUNICATIONS SYSTEM
COMM PORT
1042
1030
1040
DIGITAL TOKEN TRANSFORMATION PROCESS
MAILER NETWORK
ADDRESS HYGIENE SERVER
1050
1034
POSTAL ADDRESS DATA BASE
DATA COMMUNICATIONS SYSTEM
COMM PORT
1052
1048
ADDRESS HYGIENE PROCESS
1054

FIG. 11

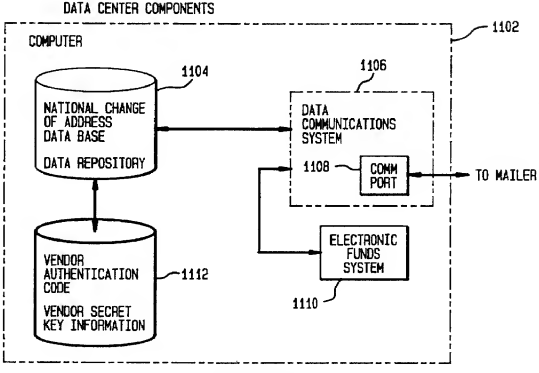

DATA CENTER COMPONENTS
COMPUTER
1102
1104
NATIONAL CHANGE OF ADDRESS DATA BASE
DATA REPOSITORY
1106
DATA COMMUNICATIONS SYSTEM
1108
COMM PORT
TO MAILER
ELECTRONIC FUNDS SYSTEM
1110
VENDOR AUTHENTICATION CODE
VENDOR SECRET KEY INFORMATION
1112

FIG. 12

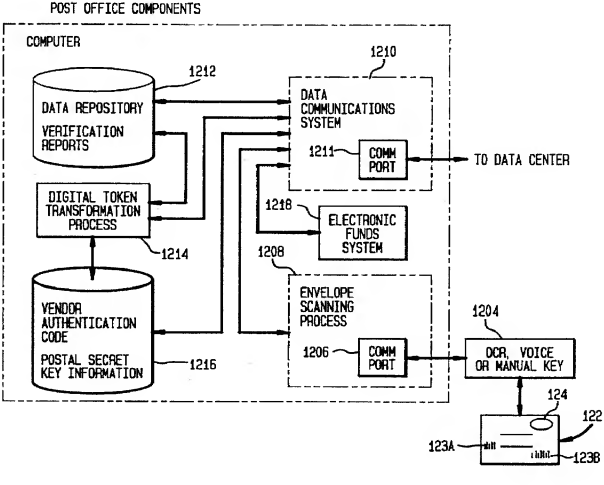
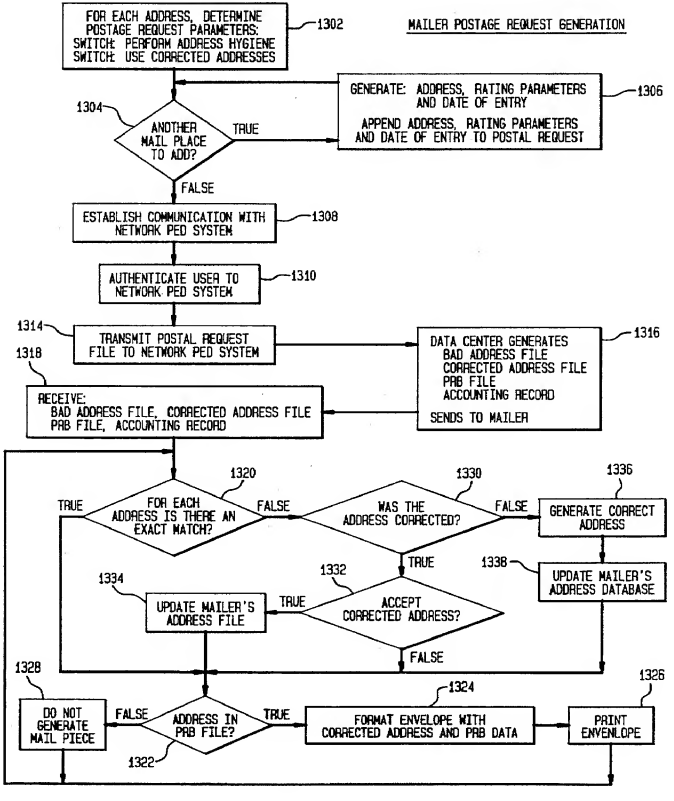

POST OFFICE COMPONENTS
COMPUTER
1210
1212
DATA REPOSITORY
VERIFICATION REPORTS
DATA COMMUNICATIONS SYSTEM
1211
COMM PORT
TO DATA CENTER
DIGITAL TOKEN TRANSFORMATION PROCESS
1214
1218
ELECTRONIC FUNDS SYSTEM
1208
ENVELOPE SCANNING PROCESS
1206
COMM PORT
1204
OCR, VOICE OR MANUAL KEY
124
122
123A
123B
VENDOR AUTHENTICATION CODE
POSTAL SECRET KEY INFORMATION
1216

FIG. 13


MAILER POSTAGE REQUEST GENERATION
FOR EACH ADDRESS, DETERMINE POSTAGE REQUEST PARAMETERS: SWITCH: PERFORM ADDRESS HYGIENE SWITCH: USE CORRECTED ADDRESSES
1302
GENERATE: ADDRESS, RATING PARAMETERS AND DATE OF ENTRY
APPEND ADDRESS, RATING PARAMETERS AND DATE OF ENTRY TO POSTAL REQUEST
1306
1304
ANOTHER MAIL PLACE TO ADD?
TRUE
FALSE
ESTABLISH COMMUNICATION WITH NETWORK PED SYSTEM
1308
AUTHENTICATE USER TO NETWORK PED SYSTEM
1310
1314
TRANSMIT POSTAL REQUEST FILE TO NETWORK PED SYSTEM
DATA CENTER GENERATES BAD ADDRESS FILE CORRECTED ADDRESS FILE PRB FILE ACCOUNTING RECORD
SENDS TO MAILER
1316
1318
RECEIVE: BAD ADDRESS FILE, CORRECTED ADDRESS FILE PRB FILE, ACCOUNTING RECORD
1320
FOR EACH ADDRESS IS THERE AN EXACT MATCH?
TRUE
FALSE
1330
WAS THE ADDRESS CORRECTED?
FALSE
1336
GENERATE CORRECT ADDRESS
TRUE
1332
ACCEPT CORRECTED ADDRESS?
TRUE
1334
UPDATE MAILER'S ADDRESS FILE
1338
UPDATE MAILER'S ADDRESS DATABASE
FALSE
1328
DO NOT GENERATE MAIL PIECE
FALSE
ADDRESS IN PRB FILE?
TRUE
1322
1324
FORMAT ENVELOPE WITH CORRECTED ADDRESS AND PRB DATA
1326
PRINT ENVENLOPE

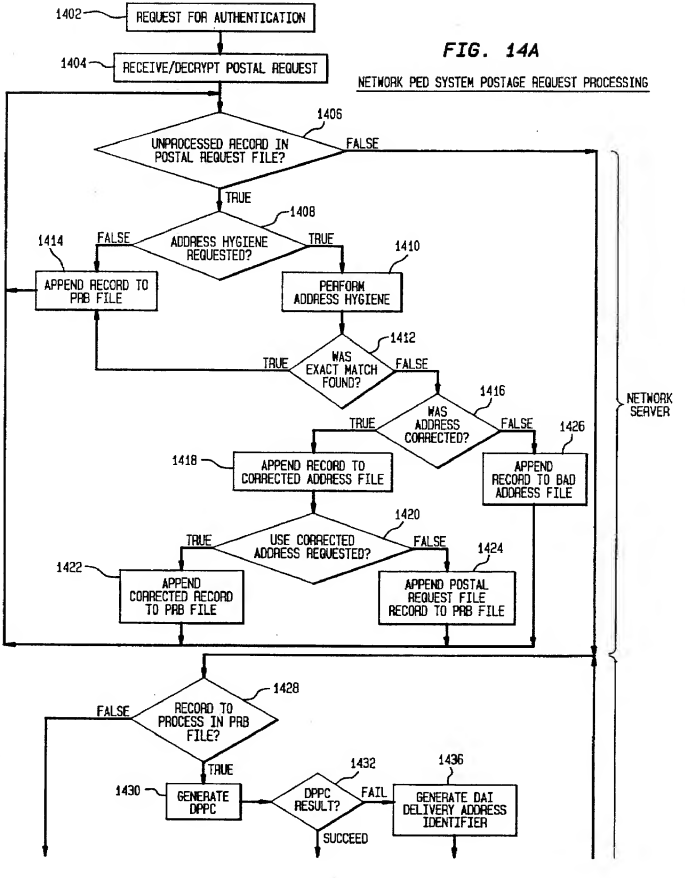


FIG. 14A

NETWORK PED SYSTEM POSTAGE REQUEST PROCESSING

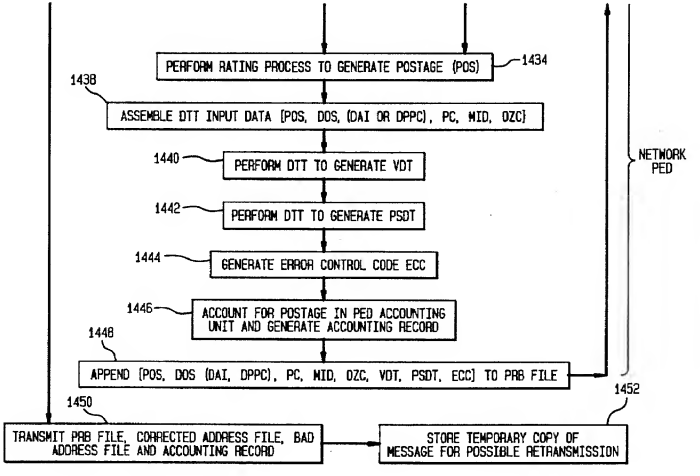
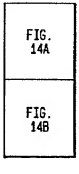


FIG. 14B

FIG. 14



ELECTRONIC DATA INTERCHANGE POSTAGE EVIDENCING SYSTEM

RELATED APPLICATIONS

This is a divisional application of Ser. No. 08/161,560 filed Dec. 6, 1993, now U.S. Pat. No. 5,454,038.

FIELD OF THE INVENTION

The present invention relates to value metering systems employing electronic data interchange and, more particularly to a postage evidencing system employing electronic data interchange.

BACKGROUND OF THE INVENTION

Postage metering systems have been developed which employ encrypted information printed on a mailpiece. The postage value for a mailpiece may be encrypted together with other data to generate a digital token. A digital token is encrypted information that authenticates the information imprinted on a mailpiece including postal value. Examples of systems for generating and using digital tokens are described in U.S. Pat. No. 4,757,537 for SYSTEM FOR DETECTING UNACCOUNTED FOR PRINTING IN A VALUE PRINTING SYSTEM; U.S. Pat. No. 4,831,555 for UNSECURED POSTAGE APPLYING SYSTEM; U.S. Pat. No. 4,775,246 for SYSTEM FOR DETECTING UNACCOUNTED FOR PRINTING IN A VALUE PRINTING SYSTEM; U.S. Pat. No. 4,873,645 for SECURE POSTAGE DISPENSING SYSTEM; and, U.S. Pat. No. 4,725,718 for POSTAGE AND MAILING INFORMATION APPLYING SYSTEM. The entire disclosure of these five patents is hereby incorporated by reference.

As a result of the digital token incorporating encrypted value, such as postage value, altering the printed information in a Postal Revenue Block is detectable by standard verification procedures.

It has been recognized that to underpay postage, an attempt may be made to interfere with the rating process (as opposed to the resulting printed postage value). Systems have been developed to protect against such attempts by the use of hash values and encrypted hash values of various rating parameters and rate tables such as is disclosed in U.S. patent application Ser. No. 133,398 filed Oct. 8, 1993, for POSTAL RATING SYSTEM WITH VERIFIABLE INTEGRITY by Leon A. Pintsov, Richard A. Connell, Ronald P. Sansone, and Alfred C. Schmidt, and assigned to Pitney Bowes Inc.

In U.S. Pat. No. 4,873,645 for SECURE POSTAGE DISPENSING SYSTEM and U.S. Pat. No. 4,725,718 for POSTAGE AND MAILING INFORMATION APPLYING SYSTEM, as well as published French Patent Application 90 01284 (Publication No. 2 657 985 for PROCESS AND INSTALLATION FOR CONTROLLING THE COMPUTERIZED POSTAL METERING OF LETTERS; it has been disclosed that addressee information can be beneficially utilized as part of the encryption process to provide enhanced security against counterfeiting of the printed digital token since the encrypted information is unique to each address.

SUMMARY OF THE INVENTION

It has been discovered that a value metering system can be provided which employs encryption but has a greater security than heretofore obtainable by prior systems.

It has been further discovered that it is possible to provide a digital token for use in imprinting on a mailpiece or other item where neither the secret key nor a secret algorithm is available at the mailer printing device or at the mailers site.

It has been further discovered that a large number of mailers can be supported in an encryption system with enhanced key management in a simple and effective manner.

The present invention further facilitates the utilization of address information which may or may not be subject to address hygiene at either the mailer's location or a remote location or on a network.

In accordance with the present invention, methods and systems for preparing mailpieces are employed. A mail list is created including mailpiece recipient address information for each mailpiece. The mailing lists includes correct recipient address information and incorrect recipient address information. The mailing list is transmitted to a data center. Received from the data center is a mailing list including hygiened recipient address information for mailpieces in the transmitted mailing list with incorrect recipient address information. Additionally received are digital tokens for each mailpiece. Each of the digital tokens includes encrypted information for each mailpiece based on the correct address information for mailpieces with correct address information .on the transmitted mailing list and on hygiened recipient address information for mailpieces with incorrect recipient address information on the transmitted mailing list.

In accordance with a feature of the present invention, rating parameter information is determined for each mailpiece. The rating parameter information constitutes the basis upon which the charges for mailpiece delivery is calculated. The rating parameter information is transmitted to the data center and the received digital token for each mailpiece are based, in addition to the recipient address information on the rating parameter information.

In accordance with another feature of the present invention, recipient address information is generated for mailpieces. The recipient address information includes correct and incorrect recipient information. Correct recipient information is generated for incorrect recipient information and a selected one of the incorrect recipient address information and the corrected recipient address information is applied to an encrypter. The encrypter generates encrypted data based on the selected one of the incorrect recipient address information and the correct recipient address information. The encrypted data then may be placed on the mailpiece.

In accordance with another feature of the present invention, recipient address information is communicated from the mailers facility to a means for encrypting. The means for encrypting is located remote from the mailer facility and contains encryption algorithm information. Encrypted data is generated by the remote encryption means based on the communicated recipient information and the encryption algorithm information. The encrypted data is transmitted from the remote encryption means to the mailer facility. The mailer facility does not have access to the encryption algorithm information.

In accordance with another feature of the present invention the encryption algorithm noted above may or may not be known; however, secret encryption key information is incorporated in the remote encryption means and the mailer facility does not have access to this secret encryption key information.

In accordance with another feature of the present invention, a digital token may be generated based on both recipient address information and corrected recipient

address information. The digital token is imprinted on the mailpiece such that a relationship exists between the selected one of the recipient address information and the corrected recipient address information and the printed digital token.

In accordance with another feature of the present invention, both digital tokens may be printed on the mailpiece along with the selected one of the recipient address information and the corrected recipient address information.

In accordance with another feature of the present invention, recipient address information may be communicated from a first location at a mailers facility over a local area network to means for encrypting at a second location at the mailer facility. The encrypting means is protected by a tamper resistant housing and coupled to the local area network. The encrypting means contains encryption algorithm information. The encryption means generates encrypted data based on the communicated recipient information and the encryption algorithm information. The encrypted data is transmitted from the encryption means over the local area network to the mailer facility first location. If desired the encrypted data may be placed on the mailpiece at the mailer facility.

In still another feature of the present invention, the encryption algorithm information may or may not be a publicly known encryption algorithm; however, the means for encryption contains secret encryption key information.

BRIEF SUMMARY OF THE DRAWINGS

Reference is now made to the following FIGURES wherein like reference numerals designate similar elements in the various views, and in which:

FIG. **1** is a block diagram of a postage evidencing system architecture embodying the present invention;

FIG. **2** is a block diagram of a communications arrangement involving a data center, a central post office and regional data centers and post offices suitable for use with the architecture disclosed in FIG. **1**;

FIG. **3** is a diagrammatic representation of the mailer unit postage evidencing system;

FIG. **4** is a diagrammatic representation of a data center adapted to interact with the mailer unit shown in FIG. **3**;

FIG. **5** is a diagrammatic representation of a carrier verification system adapted to verify postage payment evidenced in accordance with the present invention;

FIG. **6** is flow chart of the operation of the mailer unit shown in FIG. **3**;

FIG. **7** is flow chart of the operation of the data center shown in FIG. **4**;

FIG. **8** is a flow chart of the verification process for the verification authority system shown in FIG. **5**;

FIG. **9** is an architecture of an alternate embodiment of the metering system shown in FIG. **1** suitable for use in a network environment;

FIG. **10** is a diagrammatic representation of a mailer unit coupled to a network system along with other necessary components for metering postage;

FIG. **11** is a diagrammatic representation of a data center suitable for operation with the mailer unit and network arrangement shown in FIG. **10**;

FIG. **12** is a diagrammatic representation of a post office for verification of mailpieces suitable for use with the network arrangement shown in FIGS. **10** and **11**;

FIG. **13** is a flow chart of the mailer and network arrangement shown in FIG. **10**;

FIG. **14** is a flow chart of the network postage evidencing device system for the network server shown as part of FIG. **10**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference is now made to FIG. **1**. A mailer unit shown generally at **112** is utilized to generate mailpieces including suitable postage revenue blocks including necessary information to mail the letters to various addresses. The mailer unit **112** includes data necessary to process mail including mailing list information, rating information, mailer authentication code information and account data information which is stored in a storage device **115**. The mailer unit functions to create a mailing list, determine rating parameters which are used to establish the postal value to be imprinted on a mailpiece and encrypt and send to a data center the necessary information via electronic data interchange over communication link **118**. The mailer unit also receives the processed information necessary to prepare mailpieces and produces the mailpiece for dispatch into the mail stream.

The mailing list includes recipient address information. This recipient address information may include both correct and incorrect information. The nature of the incorrect information may be incomplete or inaccurate addressee data. For example, as noted below address hygiene may be employed. In such case, a determination that the address on the mailing list does not correspond to an address in the hygiene data base, the recipient addressee information would be deemed incorrect. These databases include a compilation of all address for a given region, area or even an entire country. The United States Postal Service National Address Database is one example of this type of database. It should be recognized that in many instances incorrect address information does not render a mailpiece undeliverable as addressed. For example, a street name may be misspelled or a zip code may be omitted or a "vanity" name or abbreviation may be used for a city.

Communication is encrypted to prevent eavesdropping on the communication link. A shared piece of secret data such as the mailer authentication code may be communicated in encrypted form to verify the authenticity of the mailer and likewise to verify the authenticity of the data center shown generally at **116**. It should be expressly recognized that many variations of the communications system and data flow can be established. For example, the carrier may establish a private Electronic Data Interchange standard or may work through the ANSI X.12 or EDIFACT standards committees. Moreover, various communications means could be employed including dial up modems, packet switched networks or interactive television networks.

It should also be recognized that the communications system may employ paper based transactions. For example, the mailer may provide a printed mail list to the data center for processing and the data center may provide printed labels containing valid Postal Revenue blocks. The data center **116** stores mailer account data, vendor secret keys for generating digital tokens and also a postal data base, which is a data base of valid addresses utilized in address hygiene activity. A change of address data base may also be included to correct address changes which may not be known to the mailer unit **112** as well as a data repository.

The data repository is provided at the data center to store statistical data concerning the mailer, such as total postage utilized, piece count of mail items, groupings of letters sent

to various zip codes, classes of mail service utilized and other useful data. This information is stored in a memory storage device **110** located at the data center. The data center provides the functionality of cleansing the mail list (address hygiene) and generating a postal revenue block (PRB) file. The PRB represents the information to be printed as the postal revenue block on each mailpiece by the mailer unit **112**. It updates the data repository stored in the storage device **110** as additional data is received from the mailer unit **112** and transmitted back to the mailer unit. The data center **116** further functions to collect funds and pay postage and to maintain the updated data repository for later utilization.

The data center **116** is in communication via electronic data interchange (EDI) communication link **113**. Similar to communication over the EDI link **118** between the mailer unit **112** and the data center **116**, secrecy and authenticity techniques may be implemented. In the case of the mailer unit **112** and the data center **116** the shared secret data may be a mailer authentication code which is stored in the data center as part of the mailer account data. The shared information between the data center **116** and the postal office data center **114** may be a vendor authentication code which would be stored as part of the data repository at the data center and also as part of the data repository at the post office **114**.

At the post office **114**, a postal data base is maintained as is address and a change of address data base. Additionally, a data repository and postal secret keys are stored. This information is stored in a storage device **120**. The post office **114** functions to scan and verify the postage revenue block **122** of mailpiece **124** which is physically transmitted from the mailer unit to the post office or to another verifying facility which, for example, may be a contracted facility. Alternatively, postal revenue blocks may be inspected in the field by postal or other inspectors employing suitable equipment. The post office **114** also maintains and updates the data base of addresses and maintains and updates the data repository. The detailed operation of each of these facilities, the mailer unit **112** the data center **116** and the post office **114** is described in detail in connection with both the diagrammatic representation of each of these facilities and their accompanying flow charts.

The postal revenue block **124** as well as the imprinted recipient address information **123** may be printed in machine readable form. This may be as shown at **123**A as part of the imprinted recipient address information block on the mailpiece **122** or at any selected separate location on the mailpiece (which may be as part of the postal revenue block **124** or elsewhere as shown **123**B). The particular and machine readable imprint of the postal revenue block **124** and/or recipient address information **123** is shown as imprinted in bar, half bar code. Other machine readable alpha numeric fonts are suitable for imprinting on the mailpiece **122**.

Reference is now made to FIG. **2**. The main data center of the vendor **202** is connected via a communication link **204** to the central post office **206**. The main vendor data center **202** is also connected through communication links **208** to various regional data centers shown generally at **210**. The regional data centers **210** are connected in turn to various mailers shown at **212**, **214** and **216**. The central post office **206**, similar to the main data center of the vendor **202**, is connected via communication links to regional post offices shown generally at **220**. It should be noted that the regional data center **220** may be in communication via a data link **222** to the regional post offices **210** and the various mailers **212**, **214** and **216**. Physically transmission of mailpieces to the regional post offices **220** as is shown by the dashed lines **224**, **226** and **228**. The mailers **212**, **214** and **216** are in communication with the regional data centers via communication links **213**, **215** and **217**.

It should be expressly recognized that many variations of the communications system and data flows can be established. For example, the mailers **212**, **214** and **216** can send their mailpieces directly to the central post office **206**. Moreover, the mailers can be in direct communication with the main data center **202**. Other combinations and variations are possible depending on the needs of the particular postal environment involved.

Reference is now made to FIG. **3**. The mailer unit shown generally at **302** includes a printer **304** and optionally a scale **306**. The printer **304** is connected through a print communication port **308** to the printing control system **310**. Printing control system is adapted to control the operation of the printer **304**. The optional scale **306** is connected to a scale port **312** of the rating parameter system **314**. This system **314** provides the ability to rate the mailpieces based on actual rate and/or other rating parameters measurable by the scale **306** and or associated apparatus.

Alternatively, for a mailing to be implemented, the rating parameter system **314** can, based on various information in the mailer unit computer storage **316**, determine the rating parameters to be utilized through a rating process **319**. This is based on information stored on the rating parameter system **314**. The mailing unit storage device **316** is in communications with a data communications system **318** to enable communications with a remote data center to be hereinafter described. A data communications system **318** includes a communication port **320** to facilitate the communications. A user interface **322** can be by means of I/O a communication input/output (I/O) port **324**, or by a keyboard and display, by other I/O type devices or by means of a smart card or magnetic card. A secret mailer authentication code is stored in a secure tamper resistant device **326**. The authorization code can alternatively be secret information known to the mailer and hand keyed into the system using the user interface **322**. The authorization code is then passed to the data communications system **318** to initiate a mail run in accordance with the flow chart described hereinafter.

The mailer authentication code is not part of the security of the mailing process but is part of the shared information communicated over the EDI channel **118** of FIG. **1** between the mailer **112** and the data center **116**. The mailer authentication code provides for mutual security and authentication for the mailer and the data center. It is not related to security of the postal funds or to the information imprinted on each mailpiece. Mailer account data received from the data center and stored in the storage device **316** can be sent to the printing control system for generation of incoming reports.

The printer **304** and the printing subsystem **310** as well as other areas of the mailer unit **310** and other portions of the system outside of the mailer unit may be monitored to ensure proper operation. Specifically, as an example, if the printer **304** should not properly print digital tokens (the postal revenue block **124** on mailpiece **122** this information is detected and stored in the mailer unit for communication to the data center to enable credit to be provided to the mailers account, and/or to initiate an inspection if warranted based on the number of digital tokens that are not properly printed. The failure to print the digital token by printer **304** may be due to a failure of the printer, and a failure in the communications channel, or a specific determination on the part of the mailer not to prepare the particular mailpiece. In any event, once the digital token, as will be recognized hereafter,

has been issued by the data center to the mailer, the mailers account may be charged for such digital token and audit of receipt and use of the digital token is required for the mailer to ensure that no charge is incurred for a digital token not utilized, unless such arrangement is part of the system and understanding between the mailer and the carrier involved.

Reference is now made to FIG. **4**. The mailer unit communicates to the data center shown generally at **402** via a data center communications port **404** which is part of the data communications system **406**. The data communications system **406** further includes a data communications port **408** adapted to interface to the Post Office.

The data communications system **406** is connected to a data storage device **410** which includes various information in addition to information received from the mailer. Included in the storage device **410** are: postal address database; a national change of address database; a data repository which would include information transmitted by the mailer; and, mailer account information which also would include information transmitted by the mailer. The data repository and mailer account information may include accumulated data and other data stored by the data center relevant to various transactions associated with the mailer.

A secure tamper resistant memory **412** is provided at the data center. The data center secure memory **412** may be a part of the memory **410** or a separate independent memory system. The memory **412** stores various information which need to be maintained secure, including the vendor authentication code, the mailers authentication codes, the vendor secret key information, if desired, and the digital token transformation algorithm. The data from the memory **412**, appropriate data from memory **410**, data received from the mailer via data communications system **406**, along with data from the postal rating system **418**, are processed in a digital token transformation device **414** to produce the vendor digital token. For maximum security the Post Office digital token is produced by a digital token transformation performed securely within the Post Office security device **420**. The digital tokens authenticate a mailpiece and the postage value imprinted on said mailpiece. The data used to produce the vendor digital token is also used to produce the Post Office digital token. Said data is transmitted to the Post Office security device **420** via the Postal security interface **416**. The Post Office security device produces the Post Office digital tokens via a digital token transformation and returns them to the data center via the postal security interface. The Post Office security device may be located in the data center and it contains the Post Office secret keys that are assigned by the Post Office to the data center for production of digital tokens. Alternatively, the Post Office secret keys may be stored in the data center secure storage device **412** and the Post Office digital token transformation may be performed in the digital token transformation device **414**. In this case the security of the system is reduced, because the vendor and Post Office secret information is not kept separate.

The payment for postage is transferred from the mailers account to the postal service at the data center electronic funds system **422**.

The Post Office security device **420** has the post office secret key information which is used by the digital token transformation process **414** to generate post office digital tokens. These post office digital tokens are also transmitted (along with the vendor digital tokens) to the mailer via communication port **404**. The operation of the data center components are described in greater detail in connection with the associated flow chart.

Reference is now made to FIG. **5**. A Post Office shown generally at **502** receives physical delivery of various mailpieces **122**, each including both digital tokens printed in the postal revenue block **124**. The information from the mailpiece **122** is obtained at device **504** by OCR recognition, voice input or manual key entry by a Post Office employee or by other suitable manner such as video lift image technology.

The information from the device **504** is communicated through a communication port **506** which is part of the data communications system **510**. The information capturing device **504** is utilized in conjunction with information stored in a post office data storage device **512** to verify the postal revenue block **124** by utilization of the Digital Token Transformation process **514**. The postal secret key information and other relevant secret postal information may be stored in a secure tamper resistant storage device **516**. The vendor authentication codes are also stored in the secure storage device **516**.

The storage device **512** includes: postal address database; national change of address database; postal rate database; data repository; and, verification reports. Other suitable information may be stored in this memory. An electronic funds system **518** is provided to receive funds from the data center via the data communication system **510** as part of an electronic funds transfer system. It should be noted that various .suitable funds transfer system may be employed as part of the present invention.

The data center **402** may communicate to the Post Office **502** both data repository information and verification report information to allow the Post Office **502** to be periodically updated as to this information. Similarly, the post office **502** may periodically update the data center, **402**.

It should be expressly noted that the system described is a system where secure postal key and secure vendor key and secure postal algorithm and secure vendor algorithm information may all be employed, and not stored at the mailer unit site **302**. This provides greatly enhanced security because access to information which could allow the fraudulent generation of digital tokens is completely. While the mailers may be hundreds and thousands in number, the number of vendors and the number of post office data centers requiring this information is limited in number allowing a much higher security and control to exist for this critical data.

Reference is now made to FIG. **6** which is the flow chart of the operation of the mailer unit shown in FIG. **3**. And, more particularly, the process wherein the mailer postage request is initiated and the Digital Tokens received and utilized in printing the postage revenue block.

At **602** a determined postage request is initiated and certain particular parameters associated with the process are either switched to an active or inactive state. Specifically, at **602** a determination is made by the user whether address hygiene is to be performed. The address information may not be susceptible to address hygiene due to either a lack of appropriate address information or due to mailer's desire to keep due address information in its original uncorrected form. If the address hygiene parameter switch is actuated, a further parameter switch is available to determine whether the system is to use any corrected hygiened address (that is a changed address) as opposed to the original address in generating the digital token to be imprinted on the mailpiece. This parameter switch is utilized so that a user has the option of using the uncorrected address for a particular mailpiece but still be advised of the fact that the address hygiened data base carries with it a different hygiened address.

This is a very essential feature for a mailer to be able to determine which address is utilized in generating the digital token. Assurance must be had that the digital token generated with the address information corresponds with the address printed on the envelopes. Thus, if the hygiened address is to be printed on the envelope the corrected address would be used in the generation of the digital token. On the other hand, if the uncorrected address is utilized then the uncorrected address is also utilized in generating the digital token. This allows later verification from the mailpiece itself. Moreover, from time to time address hygiened data bases themselves have incorrect information such that the hygiened address could change a correct address to an incorrect address. Thus, this option is needed at least for this purpose. Address hygiene may involve multiple communications between the mailer and the address hygiene data base. If the data base is located remotely and communication costs are involved, it may be desirable to automate the use of the particular address (corrected or uncorrected hygiened address) determined on the number of times communications are necessary to correct the address. Thus, if a corrected address comes back in a first communication pass this address may be used while if the first communication pass results in a request for further information from the user to enable address hygiene to proceed, the uncorrected address will be utilized in generating Digital Tokens. This allows the mailer to generate all of the Digital Tokens for a large number of mailpieces which may be processed in a single time in one communication pass without the necessity to delay processing of the entire group of mailpieces until multiple communications with the address hygiened data base is completed or alternatively to defer the processing of the particular mailpieces requiring multiple communications.

Alternatively, uncorrected address can be outsorted from a mail run so that all uncorrected addressed mail can be later processed, possibly as a separate batch with or without address correction.

For those rating systems that provide a discount for hygiened addresses, it may be necessary for those unhygiened addresses (where uncorrected addresses or incomplete addresses are utilized) to pay an additional postage amount. Thus, the system must provide postage value to be imprinted by hygiened and unhygiened address as appropriate. An example, of an unhygiened address in the United States is where certain "vanity" names are used as opposed to standard names stored in the postal address data base.

In areas where uncorrected addresses are utilized, it may be desirable to utilize an address identifier. This is a delivery address identifier to provide a unique addressee number associated with a particular mailpiece (this may also be utilized in connection with hygiened addresses) which can be a numeric or alphanumeric string associated with the address. The string is derived algorithmically from the data in the delivery address block. It should be such that it is difficult to produce two different address blocks that have the same delivery address identifier. A Delivery Point Postal Code (such as a zip code in the United States which may involve up to 11 digits) is an example of a delivery address identifier.

At **604** a determination is made if there is another mailpiece for which a postage request is required. If this is true (as it would be for the first postage request received) the mailer at **606** generates the address for the mailpiece (which may be hygiened or unhygiened) and the various rating parameters as well as the date of entry into the mailstream (the date in which the mail will be deposited with the carrier). Other dates of entry can be used depending upon the nature of the system involved such as the date of creation of the mailpiece. The rating parameters can vary depending upon the particular rating system associated with the carrier involved. The rating systems vary from carrier to carrier, as for example the United States Postal Service, United Parcel Service, Federal Express, United Kingdom Royal Mail, etc. These services have various rating parameters utilized to determine the appropriate price for a delivery of a particular mailpiece (which for the purpose of the present invention and disclosure is intended to include parcels). At **606** the processing of a particular mailpiece is activated by generating various information elements that may include the address, rating parameters, date of entry. This may be appended to a postal request file which is being generated as various mailpieces loop through decision block **604** and are processed at **606**. Where no further mailpieces are to be processed as determined at **604**, communications is established with a remote data center at **608**.

A procedure is initiated and completed at **610** to authenticate the data center in a known manner such that the mailer is assured that communication has been established with an authorized data center to issue the digital tokens to be printed on the mailpieces. Once this has been established, the postal request file may be encrypted at **612** and the encrypted postal data file transmitted at **614** to the data center. The data center at **616** performs its process on the transmitted encrypted postal request file as shown in detail in FIG. **7**. This process at the data center which is shown in abbreviated form at block **616** and involves: generating (if a hygiened request has been made) a bad address file; a corrected address file; a postal revenue block file (with a postal revenue block associated with each of the plurality of mailpieces involved in the transmitted encrypted postal request file); and, an accounting record of the transaction which debits funds associated with the mailer's account for the digital tokens to be transmitted to the mailer. At **616** the data center encrypts (some or all) of the above noted files, namely, the bad address file, corrected address file, postage revenue block file and accounting record, and sends these files or portions thereof to the mailer.

At **618** the mailer receives the encrypted files transmitted by the data center and decrypts these files or portions thereof depending upon the particular system implemented and the nature of the data transmitted. For each address for a given postal request file that has been transmitted, processed and received back, if for such item there is an exact match as to the address at **620**, a determination is made at **622** whether this address is in the postal revenue block file. In such case, the data is formatted at **624** and an envelope is printed at **626** with the postal revenue block. Other appropriate data may also be printed at **626** such as the address, barcode, return address and advertising slogan, unique identifiers associated with advertising material or surveys, service codes and the like.

If on the other hand the address is not in the postal revenue block file, for whatever reason, which would most likely be an error condition, the mailpiece is not generated at **628**. The process loops back to decision block **620** and continues as to the next mailpiece.

The error condition noted above at **628** is only one example of many error conditions that can exist throughout the system which would require corrective action. Another example is the postage revenue block file being out of synchronism with the postal request file. This could have occurred because of a processing error or a communication error or a component failure. Other errors can occur through-

out the system which will require similar type corrective action as noted in block **628**, or if needed or desired, to completely halt the process, to resynchronize the relationship of the various data files, and/or to reinitiate the process from the beginning. Because of the fact that funds may be accounted for where printing has not taken place, it is important that this information be communicated back to the data center **402** to allow either an electronic or physical audit to be conducted to determine the nature and extent of the error for which refunded postage may be requested.

If at **620** if there is no exact match for the particular mailpiece from the decrypted postal request file with the address in the mailers generated postal request file transmitted to the data center, a determination is made at **630** if the address was corrected. If the address was corrected a further determination is made at **632** whether to accept the corrected address and if so the mailers address data base is updated at **634** and the process continues to decision block **622** as previously noted.

If on the other hand the address was not corrected as determined at **630**, the correct current address is generated at **636** if possible. This may be a manual update or loading in of new address from another source. The inability to correct a bad address will flow through, to block **628** and result in not generating the particular mailpiece. At **638** the corrected address from **636** is used to update the mailers address data base and the process continues to decision block **622**.

Various software is suitable for use in the above process. One example is the AddressRight software marketed by, Pitney Bowes. Another example is the software program entitled Dazzle marketed by Envelope Manager Software. DAZzle Version 2.0. Copyright 1992–1993. Envelope Manager Software, 247 High Street, Palo Alto, Calif. 94301-1041. This Microsoft Windows based program deals with completing envelope layout and printing including address verification and barcode printing including barcode for the gateway for airport locations for overseas mail.

It should also be recognized that the present system described above maybe integrated with a plurality of different carriers such that in a single communications process tokens can be received and separately sorted for various carriers such as the United States Parcel Service, Federal Express, the United States Postal Service, United Kingdom Royal Mail, DHL and Airborne and the like. Moreover, the data center providing the digital tokens may process the request to identify the most suitable service to meet the requirements of the mailer. This may be based on mailing cost, delivery time, mail or parcel type or size, destination being served, insurance and the like.

Reference is now made to FIG. **7** which is a flow chart of the operation of the data center shown in FIG. **4**. At **702** a request is received to authenticate a mailer. The authentication process ensures that the data center is in communication with a specific known mailer and uses conventional techniques to authenticate the party with whom the data center is communicating. The data center then receives and decrypts the postal request file at **704** and a determination is then made at **706** if there is an unprocessed record in the postal request file. If so, a decision is then made at **708** if the address hygiene has been requested by the mailer. If so, address hygiene is performed at **710** and thereafter a determination is made at **712** if an exact match was found for the particular record in the file being processed. If this occurs, the data center at **714** appends the record to the postal revenue block file that an exact match was found in the process and loops back to decision block **766** to process the next record. The process continues again at block **708** and if, for example, the next record is a record where address hygiene has not been requested the flag indicates that fact would be appended to the record in the postal revenue block file. The entire record may be appended to the record in the postal revenue block file using the address as provided by the mailer at block **714**.

If at block **712** an exact match was not found as part of the address hygiene process, a determination is made at **716** whether the address was corrected as part of the address hygiene process at **710**. If this is true, the indication of this fact is appended to the corrected address file at **718**. A further determination is made at **720** whether the mailer has requested to use the corrected address in generating the digital token. If so, at **722** the corrected address record is appended to the postal revenue block file. If on the other hand, the mailer had determined at **720** not to use the corrected address file, the postal request file is appended to the postal revenue block file at **724** to be used in the generation of the digital tokens.

If at **716** if the address was not corrected, the record is appended to the bad address file at **726** and no digital token will be generated for this address. Thus, if address hygiene was requested by the mailer and the data center was unable to correct address hygiene and conduct the particular address involved, no digital token is generated. This fact is noted in the bad address file for later action by the mailer and no funds are withdrawn for this particular mailpiece. After decision block **76** determines that there are no further unprocessed records in the postal request file, the process continues to proceed to generate digital tokens.

At **728** a determination is made if there is a record to process in the postage revenue block file. If this is true, a delivery point postal code is generated at **730**. In the United States this delivery point postal code is the 11 digit code. Specifically, it is a unique address identifier. The delivery point postal code is an identifier which is unique to each address and as noted above is an example of a delivery address identifier. If the delivery point postal code is successfully generated as determined at **732**, the rating process is performed at **734**. This generates the proper required amount of postage for the mailpiece involved. An example of the type of rating process and procedure which could be used is described in the above-identified pending U.S. Patent Application for POSTAL RATING SYSTEM WITH VERIFIABLE INTEGRITY. Other forms of rating processes may also be suitably employed. If at **732** a delivery point postal code has not been successfully generated, at **736** a delivery address identifier is generated and thereafter the rating process proceeds at **734**.

At **738** an assembly is made of the digital token transformation input data which may include the postage amount; the date of submission; delivery address identifier or delivery point postal code as the case may be; piece count; mailer identification data; and, origination identifier (such as origination zip code).

The generation of a digital token can use many different forms of input data to create a digital token to ultimately be printed on a mailpiece. The particular organization and nature of the input data and the transformation involved is a matter of the requirements of the mailer, the carrier and the level of security desired. At **740** the digital token transformation is performed to generate the vendor digital token and at **742** the postal service digital token transformation is performed to generate the postal service or carrier service digital token.

The digital token transformation at **742** is a second digital token transformation. This digital token transformation utilizes the postal service or courier service black box at the data center (see block **420** in FIG. **4**). Moreover, the transformation process and the algorithms involved can be different in the transformations at **740** and **742**. Each is separately selected. The vendor selects the particular transformation at **740** subject to various regulations of the carrier service. The carrier selects the transformation of **742** to meet its requirements. At the data center, because of the security of the postage security device **420** which is not accessible to data center personnel or only to limited authorized data center personnel, the vendor has the ability to generate the postal service or carrier digital token without knowing the precise transformation involved.

An error control code is generated at **744** and appended to the string of data. This is provided to effectuate high speed accurate automatic data capture, and processing where error control codes are normally employed to detect and correct the corruption of data. The error control code is utilized at later date when scanning the string of data to ensure the data has been scanned properly or keyed in properly. It is used in standard fashion to verify the integrity of the process of the data entry. The data center at **746** accounts for the postage and generates accounting record and charges the postage to the mailers account. This may also involve the transfer of funds from one account to another account, such as from the mailers account to the carriers account, or through intermediary accounts such as a trustee account to the carrier account. At **748** the postal revenue block file is appended to it include the following data: the postage date of submission; delivery address identifier or delivery point postal code, as the case may be; piece count; mailer identifier; origination zip code; vendor digital token; postal service and/or carrier digital token; and, error control code. Again as noted above, the selection of the particular data and the manner in which its processed and organized is subject to meeting the requirements of the particular system involved. A mailing run identifier for the particular mail run may also be included.

The above process continues until it is determined at **728** that there are no more records in the postal revenue block file to be processed. At this time, at **750**, the postal revenue block file, corrected address file, bad address file and accounting record are encrypted and at **752** transmitted to the mailer. A copy of the message transmitted to the mailer is stored at the data center for later possible retransmission and/or statistical analysis and/or later audit. Depending on the requirements of the system the storage can be temporary and/or permanent.

Reference is now made to FIG. **8** which is a flow chart of the verification process for the verification authority system shown in FIG. **5**. Each received mailpiece is scanned at **802** for address and postal revenue block data. The scanning can be done by any suitable means. Examples of suitable scanning systems include hand held scanners and fixed high speed scanners typically employed by postal processing equipment. The scanning can be of alphanumeric data or barcode or other coded printed data depending upon the particular system employed and the requirements of the system. The scanning may be performed by a person reading the data on the envelope and keying it in through a user interface at **504**.

The outcome of the scanning at **802** may be an ASCII file, of processible data to be thereafter utilized. A determination is made at **804** as to whether the error correction code appended as shown in FIG. **7** is correct. If it is correct, a determination is made at **806** of the postal service key from the vendor identification and the mailer identification numbers. Thereafter, a digital token is generated with the postal service key at **808** and a comparison is made at **810** between the postal service digital token printed on the mailpiece with the previously generated digital token at **808**. The vendor token can be processed in similar manner. Depending on the system, decryption techniques, rather than reencryption techniques may be employed if desired. A determination is made at **812** whether the comparison of the postal service digital token read from the mailpiece and the one generated at **808** compared correctly. If matched, the process continues. It may be desired however at **814** to randomly, or based on other criteria, as for example, level of usage of a particular mailer, destination, density for mailpieces and the like, or profile of the mailer, select mailpieces for vendor verification by comparing the vendor digital token with the vendor digital token printed on the mailpiece. If it is determined at **812** that a match did not occur, the mailpiece is outsorted for manual inspection at **816**. It should be recognized first if at **804** the error correction code did not verify as correct, the process may either be stopped or a manual inspection may be conducted at **818**. The vendor digital token may be also processed in a similar manner.

As previously noted, an alternate embodiment of the metering system shown and described in connection with FIGS. **1** and **3** through **7** is shown in connection with FIGS. **9** through **14**. This embodiment in FIGS. **9** through **14** is suitable for use in a network environment. To a large extent, similar reference numerals are used (other than the first digit for FIGS. **1** through **9** and the first two digits for FIGS. **9** through **14**) in FIGS. **9** through **14** to designate similar system elements as designated in FIGS. **1** and **3** through **7**. The similar structure operates in a similar manner and will not be described again in detail.

Reference is made to FIG. **9**. The division of function between the mailer unit **912** and data center **910** is modified since the digital tokens are now generated at the mailer facility. Thus, the functions of updating the data repository and the new function of uploading the data repository information are incorporated in the mailer unit **912** as well as cleansing the mailing list and generating the postage revenue block file. The function in the mailer unit of encrypting and sending the postal revenue request file to the data center is no longer required and has been eliminated. This is because, as will be apparent in FIG. **10**, a secure postage evidencing device is provided at the mailer facility on the mailer network. Encryption, however, if desired can still be employed for communications on the mailer network as an option to the mailer for security purpose.

Reference is made to FIG. **10** which is a diagrammatic representation of a mailer unit coupled to a network system along with the other necessary components for metering postage. The mailer unit **1002** is connected through a communications port **1028** to a mailer network **1030**. The mailer network **1030** may be a local area network. It may be a wireless or a wired network. It may be a telephone network or other suitable communication system to allow communication between the various mailer components.

Connected to the mailer network are a postal evidencing device shown generally at **1032** and an address hygiene server or device shown generally at **1034** these devices **1032** and **1034** function to provide the necessary functions of the data center shown in FIG. **4**; however, the secure postage evidencing functions are embodied in the postage evidencing device **1032** while the address hygiene functions are embodied in the device **1034**. The address hygiene functions of device **1034**, may be, if desired, incorporated in the

postage evidencing device **1032** or in the mailer unit **1002** or even left at the data center or another remote facility.

The postage evidencing device **1032** includes a data communications system **1036** connected to a data storage device **1038** which includes various information in addition to information received from the mailer unit **1002** over the network **1030**. Included in the storage device **1038** are: vendor and postal secret key information; data repository which would include information transmitted by the mailer unit **1002**; and, mailer account information which may also include information transmitted by the mailer and serial number. The data repository and mailer account information may include, similar to FIG. **4** accumulated data and other data stored by the data center relevant to various transactions associated with the mailer. The memory **1038** is a secure tamper resistant memory and the entire postage evidencing device may be secured in a separate secure location within the mailer facility or to a remote mailer facility on the mailer network.

A digital token transformation processing device **1040** is provided. The data from the memory **1038** along with appropriate data from the mailer unit **1002** and the and/or the address hygiened server **1034**, are processed in the digital token transformation processing device **1040**. The digital tokens are communicated via a communication port **1042** in the data communication system to the mailer unit **1002** to be utilized in the manner previously described. The network secure memory device **1038** contains the vendor secret key and the Post Office secret key assigned to the network postage evidencing device **1032** for production of digital tokens. There is not Post Office security device in the network system corresponding to data center Post Office security device **420** in FIG. **4**. In the case of the data center system, the data center contains sufficient information for a forger to imitate all mailers using the data center, and thus it is important for the Post Office to maintain security independent of the vendor to assure the integrity of the system. In the case of the network system the postage evidencing device contains only sufficient information to imitate itself, and so there is no advantage significant to maintaining the vendor secret key and the Post Office secret key in separate secure devices.

The address hygiene server **1034** includes a memory **1048** having the postal address database stored therein. The storage device **1048** is connected through the communication port **1052** of the data communications system **1050** to the network **1030**. The address information is received via the network and the communication port **1052** which is thereafter flowed into the memory **1048** for processing in the address hygiene process device **1054**. Hygiened address information is communicated via the communication port **1052** and the network **1030** to the postage evidencing device **1038** and to mailer unit **1002**.

Reference is now made to FIG. **11** which is the diagrammatic representation of the data center suitable for operation with the mailer unit and the network arrangement shown in FIG. **10**. Data center shown generally at **1102** includes a memory **1104** containing the national change of address database and the data repository. The memory **1104** is connected to the mailer unit **1002** via a data communication system **1006** having a communication port of **1108**. The memory **1104** includes the information which is uploaded to the mailer facility **912**. The data center may include an electronic funds system **1110** which functions similarly to the electronic funds transfer system **518** shown in FIG. **5**. This is to denote that the electronic funds transfer system may be part of the data center as opposed to or in addition to the post office system. Thus, where the electronic funds accounting and transfer occurs at the data center, this information is communicated to the mailer and to the post office. When as in FIG. **5**, the electronic funds system is at the post office, the accounting information is communicated from the post office to the mailer through the data center.

A secure memory **1112** is also provided at the data center **1102**. The secure memory stores vendor authentication code; vendor secret key information; and postal secret key information, if desired. The secure memory **1112** may be a portion of the memory **1104** or a separate secure memory in a tamper resistant housing.

Reference is now made to FIG. **12** which is a diagrammatic representation of a post office system suitable for work with the network arrangement. The post office **1202** includes a memory **1212** containing the data repository and verification reports. Additionally stored, if desired, is of the additional information shown in the memory **512** of FIG. **5**. However, the postal address database and national change of address database can be stored if desired, at the address hygiened server **1034** or at the data center **1102**. The post office system shown in FIG. **12** functions in the same manner as that shown in FIG. **5** to authenticate and verify payment of postage for various mailpieces delivered by mailers to the post office.

Reference is now made to FIG. **13**. As can be seen by a comparison of FIG. **13** AND FIG. **6**, the flow of the operation of the mailer facility is very similar to the mailer unit; however, communication is established with the network postage evidencing system at **1308** and the postage evidencing system functions in much the same way as the data center functions in the non network system shown in FIGS. **1** through **8**.

Reference is now made to FIG. **14**. As can be seen by a similar comparison of FIG. **13** and FIG. **7**, the postage evidencing system on the network processes requests in a similar manner as the data center shown in FIG. **7** processes requests. The functionality, however, is divided between address hygiene server **1034** and the postage evidencing device **1032**.

It should be noted that the above described system provides numerous benefits to the mailer, the data center and the post office. The benefits include:

For the mailer:

1) Accurate funds tracking for multiple accounts.
2) Automatic access to centralized address information, including frequently updated change of address information.
3) A majority of communication between mailer, data center and a carrier can be made totally transparent to communicating parties by employing electronic data interchange methods.
4) Confidentiality and authenticity of all sensitive information can be protected.
5) A low cost effective mailpiece preparation solution for mailer is provided.
6) Convenient access to postage payment is provided.
7) The data center may provide for additional information or control of job run and other scheduling for optimization of delivery time and mailing costs' based on postal network information.
8) The data center can provide various different and/or similar services through alternative carriers for special services and packages.
9) The data center can provide customized mailing lists both nationally and internationally based on market demographics.

10) Data Center can provide distributed hybrid mail the data center may also be a mail center which can generate the physical mail for the mailer, close to physical delivery addresses.
11) The systems conform to and are compatible with computer networked based business operations.
12) A single device solution is provided for a mailer's facility using local area network arrangements such as, for example campus, metropolitan area, geographic area or company using corporate or other network arrangements.

For the Data Center:

1) Secret encryption key management is much more effective.
2) Access is provided to customers mailings for marketing and usage information.
3) Ability is provided to to monitor mailing frequency and geographic distribution.
4) The data center can provide evidence of authenticity of payment or data for other applications.
5) A single point of contact is provided for distribution services to mailer.
6) data repositories.

For the Post Office (or other carrier):

1) High quality addresses give mail is generated which is suitable for automated processing from small and intermediate size mailers. The cost of mail distribution is therefor reduced.
2) The quality of information for verification is much higher.
3) The postal service burden for implementation may be minimal and is facilitated. The format of all communications between vendor and post office are predefined by the interface.
4) Access to summary information of system use provides a guide for sampling and verification.
5) A way is enabled to provide special discounts and customized rates for mailers.
6) A natural and significantly simplified way is enabled to provide special services such as certified, registered, international and overnight mail for mailers.
6) Provides a planning tool for new services and facilities for small and medium size mailers.

It should be recognized that some of the benefits are more particularly found in the network embodiments disclosed above as opposed to the non-network embodiments. Specifically, the network postage evidencing device systems described may, in certain instances be better suited to particular mailing applications as opposed to the non-network systems. For example, the non-local area network system may be better suited to fit batch mailers will regular planned mailings who wish to directly interact with a central data center and/or post office and/or carrier, rather than conduct internal accounting. On the other hand, the network avoids the need to provide modems and telephone lines for each mail generation station or for multiple mail generation stations. Moreover, access to an electric data interchange may be expensive.

Telephone line charges may have a fixed cost that would be shared over the total number of tokens processed for a small number of digital tokens, this may be expensive. The network systems and method on the other hand, may best fit businesses with less periodic smaller mailings or several mail generation stations. Other consideration include that computer networks can provide a direct high-speed link to a network postage evidencing device for mail generation stations. The cost of network attachment would be shared with all other network based activities. Network devices, in certain situations, may better fit high volume mailers with large token processing requirements. An additional factor that may involve the selection and design of the particular system, is the bandwith of the system itself or the communication requirements which may include issues such as, performance requirements and centralized distribution at the mailers site.

It should be recognized that all of the above factors are simply considerations which may cause an individual mailer to select one particular approach over another. However, either approach would be satisfactory to solve any mailer requirements and may be dictated by external factors such as requirements of the carrier service involved and the availability of hardware, communications, and software.

While the present invention has been described with reference to the specific embodiments, it is apparent that many variations and modifications may be made to these various embodiments. It is thus intended in the following claims to cover each variation and modification that falls within the true spirit and scope within the present invention.

What is claimed is:

1. A method for preparing mail pieces comprising the steps of:

communicating from a mailer facility recipient address information to means for encrypting, said encrypting means located remote from said mailer facility and containing encryption algorithm information;

generating encrypted data by said remote encryption means based on said communicated recipient information and said encryption algorithm information;

transmitting said encrypted data from said remote encryption means to said mailer facility; and

said mailer facility not having access to said encryption algorithm information.

2. A method as defined in claim **1** wherein the encrypted algorithm information includes a secret key.

3. A method for preparing mail pieces comprising the steps of:

communicating from a mailer facility recipient address information to means for encrypting. said encrypting means located remote from said mailer facility and containing secret encryption key information;

generating encrypted data by said remote encryption means based on said communicated recipient information and said secret encryption key information;

transmitting said encrypted data from said remote encryption means to said mailer facility; and

said mailer facility not having access to said secret encryption key information.

4. A method as defined in claim **3** wherein said secret key is associated with said mailer.

5. A method as defined in claim **3** wherein said secret key is associated with said mailer facility.

6. A method as defined in claim **3** further comprising placing said encrypted data on said mail piece at said mailer facility.

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